

PLUS  
8/11/04

Butler, Douglas

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**From:** PLUS  
**Sent:** Monday, August 02, 2004 3:02 PM  
**To:** Butler, Douglas  
**Subject:** PLUS Results for 10750399

Here are the PLUS search results for 10750399.

This search was prepared by the staff of the Scientific and Technical Information Center, SIRA. If you have questions or comments about this search, please reply via email to PLUS@uspto.gov.



10750399\_QUAL.txt



10750399\_LIST.txt



10750399\_WEST.txt



10750399\_EAST.txt



10750399.east



10750399\_CLS.txt



10750399\_CLSTITLES.txt



10750399\_WDS.txt

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## 10750399\_LIST

10750399

PLUS Search Results for S/N 10750399, Searched August 02, 2004

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present. PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

5390947	6230854	6085880
5944147	4896712	3675742
6241052	5303450	3665657
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5906253	4273460	4385680
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4598799	4953670	4585097
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5193832	5974798	4798268
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5692586	4290505	4848526
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5806794	5984422	5595423
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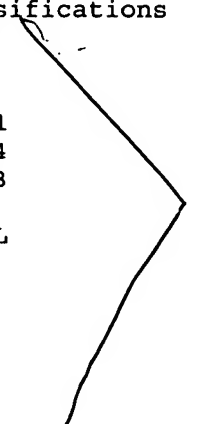
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10750399\_CLS

Most Frequently Occurring Classifications of Patents Returned  
From A Search of 10750399 on August 02, 2004

Original Classifications

10 188/71.5  
8 188/18A  
6 188/71.9  
4 301/105.1  
3 188/73.44  
3 301/37.43  
2 60/435  
2 188/1.11L  
2 188/72.4  
2 188/72.7  
2 188/72.8  
2 280/276  
2 301/36.1  
2 475/86



Cross-Reference Classifications

7 188/18A  
6 188/170  
4 188/196BA  
4 188/196D  
4 188/26  
4 188/71.5  
4 188/72.6  
4 188/72.9  
4 188/73.45  
3 188/106F  
3 188/161  
3 188/218XL  
3 188/71.1  
3 188/71.9  
3 188/72.3  
3 188/74  
3 192/111A  
3 475/221  
3 475/900  
2 16/35R  
2 60/487  
2 60/589  
2 60/591  
2 74/607  
2 180/247  
2 188/181R  
2 188/196P  
2 188/196V  
2 188/202  
2 188/218A  
2 188/24.12  
2 188/24.22  
2 188/349  
2 188/73.31  
2 192/107R  
2 192/3.51  
2 192/45  
2 192/48.6

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2 192/70.17  
 2 192/70.19  
 2 192/70.2  
 2 244/111  
 2 251/129.15  
 2 280/277  
 2 280/93.512  
 2 301/105.1  
 2 301/108.4  
 2 301/124.1  
 2 301/35.628  
 2 301/37.36  
 2 384/544  
 2 384/589  
 2 384/906  
 2 403/359.2  
 2 475/150  
 2 475/159

Combined Classifications

15 188/18A  
 14 188/71.5  
 9 188/71.9  
 7 188/170  
 6 301/105.1  
 5 188/196BA  
 5 188/72.9  
 5 188/73.45  
 4 188/196D  
 4 188/218XL  
 4 188/26  
 4 188/72.6  
 4 188/73.44  
 4 301/37.43  
 3 188/106F  
 3 188/161  
 3 188/71.1  
 3 188/72.3  
 3 188/72.4  
 3 188/72.7  
 3 188/73.31  
 3 188/74  
 3 192/111A  
 3 244/111  
 3 251/129.15  
 3 301/124.1  
 3 301/37.36  
 3 475/221  
 3 475/900  
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 2 60/589  
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 2 74/607  
 2 180/247  
 2 180/249  
 2 188/1.11L  
 2 188/181R



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2 188/196P  
2 188/196V  
2 188/202  
2 188/218A  
2 188/24.12  
2 188/24.22  
2 188/319.2  
2 188/344  
2 188/349  
2 188/71.8  
2 188/72.5  
2 188/72.8  
2 192/104B  
2 192/107R  
2 192/3.51  
2 192/35  
2 192/45  
2 192/48.6  
2 192/70.17  
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2 280/93.512  
2 301/108.4  
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2 301/36.1  
2 303/9.63  
2 384/448  
2 384/544  
2 384/589  
2 384/906  
2 403/359.2  
2 475/150  
2 475/159  
2 475/85  
2 475/86

## 10750399\_CLSTITLES

Titles of Most Frequently Occurring Classifications of Patents Returned  
From A Search of 10750399 on August 02, 2004

- 15 188/18A (8 OR, 7 XR)  
     Class 188 : BRAKES  
     188/2R      VEHICLE  
     188/17      .Hub or disk  
     188/18R      ..Motor vehicle  
     188/18A      ...Disc brakes
- 14 188/71.5 (10 OR, 4 XR)  
     Class 188 : BRAKES  
     188/67      ROD  
     188/71.1     .Axially movable brake element or housing  
                   therefor  
     188/71.5     ..Plural rotating elements (e.g., "multidisc")
- 9 188/71.9 (6 OR, 3 XR)  
     Class 188 : BRAKES  
     188/67      ROD  
     188/71.1     .Axially movable brake element or housing  
                   therefor  
     188/71.7     ..With means to adjust for wear of brake  
     188/71.8     ...Self-adjusting means  
     188/71.9     ....Including unidirectionally rotating screw
- 7 188/170 (1 OR, 6 XR)  
     Class 188 : BRAKES  
     188/381      FRICTIONAL VIBRATION DAMPER  
     188/166      .Spring  
     188/170      ..Fluid-pressure release
- 6 301/105.1 (4 OR, 2 XR)  
     Class 301 : LAND VEHICLES: WHEELS AND AXLES  
     301/5.1      WHEEL  
     301/105.1     .Hub
- 5 188/196BA (1 OR, 4 XR)  
     Class 188 : BRAKES  
     188/381      FRICTIONAL VIBRATION DAMPER  
     188/196R      .Slack  
     188/196B      ..Ratchet  
     188/196BA     ...Rotatable
- 5 188/72.9 (1 OR, 4 XR)  
     Class 188 : BRAKES  
     188/67      ROD  
     188/71.1     .Axially movable brake element or housing  
                   therefor  
     188/72.1     ..With means for actuating brake element  
     188/72.9     ...By pivoted lever
- 5 188/73.45 (1 OR, 4 XR)  
     Class 188 : BRAKES  
     188/67      ROD  
     188/71.1     .Axially movable brake element or housing

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therefor

188/73.31     ..Retainer for brake element  
188/73.43     ...Including actuator slidable in plane  
                    parallel to axis of rotation of wheel  
188/73.44     ....On axially extending pin  
188/73.45     .....Plural pins

4 188/196D     (0 OR, 4 XR)  
Class 188 : BRAKES  
188/381       FRICTIONAL VIBRATION DAMPER  
188/196R       .Slack  
188/196D       ..Frictional rotation

4 188/218XL    (1 OR, 3 XR)  
Class 188 : BRAKES  
188/381       FRICTIONAL VIBRATION DAMPER  
188/218R       .Brake wheels  
188/218XL       ..Disk type

4 188/26       (0 OR, 4 XR)  
Class 188 : BRAKES  
188/2R         VEHICLE  
188/24.11       .Velocipede (e.g., bicycle, etc.)  
188/26         ..Hub or disk

4 188/72.6     (0 OR, 4 XR)  
Class 188 : BRAKES  
188/67         ROD  
188/71.1       .Axially movable brake element or housing  
                    therefor  
188/72.1       ..With means for actuating brake element  
188/72.4       ...By fluid pressure piston  
188/72.6       ....And/or mechanical linkage

4 188/73.44    (3 OR, 1 XR)  
Class 188 : BRAKES  
188/67         ROD  
188/71.1       .Axially movable brake element or housing  
                    therefor  
188/73.31       ..Retainer for brake element  
188/73.43       ...Including actuator slidable in plane  
                    parallel to axis of rotation of wheel  
188/73.44       ....On axially extending pin

4 301/37.43    (3 OR, 1 XR)  
Class 301 : LAND VEHICLES: WHEELS AND AXLES  
301/5.1         WHEEL  
301/37.101       .With wheel cover  
301/37.42       ..Plastic cover  
301/37.43       ...Permanently secured to wheel

3 188/106F     (0 OR, 3 XR)  
Class 188 : BRAKES  
188/381       FRICTIONAL VIBRATION DAMPER  
188/105       ..Multiple  
188/106R       ..Vehicle  
188/106F       ...Fluid and mechanical

3 188/161       (0 OR, 3 XR)

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- Class 188 : BRAKES  
 188/381 FRICTIONAL VIBRATION DAMPER  
 188/158 .Electric  
 188/161 ..Electromagnet
- 3 188/71.1 (0 OR, 3 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/71.1 .Axially movable brake element or housing therefor
- 3 188/72.3 (0 OR, 3 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/71.1 .Axially movable brake element or housing therefor  
 188/72.1 ..With means for actuating brake element  
 188/72.3 ...And means for retracting brake element
- 3 188/72.4 (2 OR, 1 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/71.1 .Axially movable brake element or housing therefor  
 188/72.1 ..With means for actuating brake element  
 188/72.4 ...By fluid pressure piston
- 3 188/72.7 (2 OR, 1 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/71.1 .Axially movable brake element or housing therefor  
 188/72.1 ..With means for actuating brake element  
 188/72.7 ...By inclined surface (e.g., wedge, cam or screw)
- 3 188/73.31 (1 OR, 2 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/71.1 .Axially movable brake element or housing therefor  
 188/73.31 ..Retainer for brake element
- 3 188/74 (0 OR, 3 XR)  
 Class 188 : BRAKES  
 188/67 ROD  
 188/74 .Transversely movable
- 3 192/111A (0 OR, 3 XR)  
 Class 192 : CLUTCHES AND POWER-STOP CONTROL  
 192/30R CLUTCHES  
 192/111R .Wear compensators  
 192/111A ..Automatic wear compensators
- 3 244/111 (1 OR, 2 XR)  
 Class 244 : AERONAUTICS  
 244/110R RETARDING AND RESTRAINING DEVICES  
 244/111 .Wheel brake arrangement

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- 3 251/129.15 (1 OR, 2 XR)  
     Class 251 : VALVES AND VALVE ACTUATION  
     251/129.01 ELECTRICALLY ACTUATED VALVE  
     251/129.15 .Including solenoid
- 3 301/124.1 (1 OR, 2 XR)  
     Class 301 : LAND VEHICLES: WHEELS AND AXLES  
     301/124.1 AXLE
- 3 301/37.36 (1 OR, 2 XR)  
     Class 301 : LAND VEHICLES: WHEELS AND AXLES  
     301/5.1 WHEEL  
     301/37.101 .With wheel cover  
     301/37.35 ..Wheel body or rim having integral securing  
                     bump  
     301/37.36 ...Bump on rim
- 3 475/221 (0 OR, 3 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                     COMPONENTS  
     475/220 DIFFERENTIAL PLANETARY GEARING  
     475/221 .Differential or nondifferential planetary  
                     combined with differential (e.g., two differentials)
- 3 475/900 (0 OR, 3 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                     COMPONENTS  
     475/900 BRAKE FOR INPUT OR OUTPUT SHAFT
- 2 16/35R (0 OR, 2 XR)  
     Class 016 : MISCELLANEOUS HARDWARE  
     16/18R CASTERS  
     16/35R .Locked
- 2 60/435 (2 OR, 0 XR)  
     Class 060 : POWER PLANTS  
     60/325 PRESSURE FLUID SOURCE AND MOTOR  
     60/435 .Having a mechanical clutch or brake device in  
                     the power train
- 2 60/487 (0 OR, 2 XR)  
     Class 060 : POWER PLANTS  
     60/325 PRESSURE FLUID SOURCE AND MOTOR  
     60/487 .Input pump and rotary output motor system  
                     having displacement varying type of direction or speed  
                     selector
- 2 60/589 (0 OR, 2 XR)  
     Class 060 : POWER PLANTS  
     60/325 PRESSURE FLUID SOURCE AND MOTOR  
     60/533 .Pulsator  
     60/585 ..Holder for reserve liquid feeds master  
     60/589 ...Master piston or its actuator mechanically  
                     operates valve between holder and master cylinder
- 2 60/591 (0 OR, 2 XR)  
     Class 060 : POWER PLANTS  
     60/325 PRESSURE FLUID SOURCE AND MOTOR  
     60/533 .Pulsator

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- 60/591           ..Having valve, director, or restrictor in  
                  pulse fluid flow path
- 2    74/607           (0 OR, 2 XR)  
      Class    074 :   MACHINE ELEMENT OR MECHANISM  
      74/469           CONTROL LEVER AND LINKAGE SYSTEMS  
      74/606R          .Gear casings  
      74/607           ..Axle and torque tubes
- 2    180/247          (0 OR, 2 XR)  
      Class    180 :   MOTOR VEHICLES  
      180/233          HAVING FOUR WHEELS DRIVEN  
      180/247          ..With manually operated means for disengaging  
                          drive to one or more, but fewer than all, of the four  
                          wheels
- 2    180/249          (1 OR, 1 XR)  
      Class    180 :   MOTOR VEHICLES  
      180/233          HAVING FOUR WHEELS DRIVEN  
      180/248          ..With differential means for driving two wheel  
                          sets at dissimilar speeds  
      180/249          ..And means for locking out the differential  
                          means
- 2    188/1.11L        (2 OR, 0 XR)  
      Class    188 :   BRAKES  
      188/1.11R        WITH CONDITION INDICATOR  
      188/1.11W        .Wear  
      188/1.11L        ..Electrical
- 2    188/181R         (0 OR, 2 XR)  
      Class    188 :   BRAKES  
      188/381          FRICTIONAL VIBRATION DAMPER  
      188/174          .Weight  
      188/180          ..Regulators  
      188/181R         ...Vehicle
- 2    188/196P         (0 OR, 2 XR)  
      Class    188 :   BRAKES  
      188/381          FRICTIONAL VIBRATION DAMPER  
      188/196R         .Slack  
      188/196P         ..Friction
- 2    188/196V         (0 OR, 2 XR)  
      Class    188 :   BRAKES  
      188/381          FRICTIONAL VIBRATION DAMPER  
      188/196R         .Slack  
      188/196V         ..Screw, shim or cam
- 2    188/202          (0 OR, 2 XR)  
      Class    188 :   BRAKES  
      188/381          FRICTIONAL VIBRATION DAMPER  
      188/196R         .Slack  
      188/197          ..Railway car  
      188/198          ...Automatic  
      188/202          ....Screw
- 2    188/218A         (0 OR, 2 XR)  
      Class    188 :   BRAKES

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188/381            FRICTIONAL VIBRATION DAMPER  
 188/218R          .Brake wheels  
 188/218A          ..Dust guard

2 188/24.12        (0 OR, 2 XR)  
     Class 188 : BRAKES  
     188/2R        VEHICLE  
     188/24.11     .Velocipede (e.g., bicycle, etc.)  
     188/24.12     ..Including mechanism for opposed gripping of  
                     wheel rim or tire

2 188/24.22        (0 OR, 2 XR)  
     Class 188 : BRAKES  
     188/2R        VEHICLE  
     188/24.11     .Velocipede (e.g., bicycle, etc.)  
     188/24.12     ..Including mechanism for opposed gripping of  
                     wheel rim or tire  
     188/24.22     ...Specific actuator element structure

2 188/319.2        (1 OR, 1 XR)  
     Class 188 : BRAKES  
     188/266        INTERNAL-RESISTANCE MOTION RETARDER  
     188/297        .Having a thrust member with a variable volume  
                     chamber (e.g., coaxial or telescoping tubes, compensat  
 ing                reservoir)  
     188/316        ..Fluid through or around piston within chamber  
     188/317        ...Via fixed or variable orifice in piston  
     188/319.2      ....Orifice size varied using a hand or hand  
                     tool

2 188/344          (1 OR, 1 XR)  
     Class 188 : BRAKES  
     188/381        FRICTIONAL VIBRATION DAMPER  
     188/151R       .Fluid pressure  
     188/152        ..Road vehicle  
     188/344        ...Velocipede

2 188/349          (0 OR, 2 XR)  
     Class 188 : BRAKES  
     188/381        FRICTIONAL VIBRATION DAMPER  
     188/151R       .Fluid pressure  
     188/152        ..Road vehicle  
     188/349        ...With front rear brake apportioner

2 188/71.8        (1 OR, 1 XR)  
     Class 188 : BRAKES  
     188/67        ROD  
     188/71.1       .Axially movable brake element or housing  
                     therefor  
     188/71.7       ..With means to adjust for wear of brake  
     188/71.8       ...Self-adjusting means

2 188/72.5        (1 OR, 1 XR)  
     Class 188 : BRAKES  
     188/67        ROD  
     188/71.1       .Axially movable brake element or housing  
                     therefor

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- 188/72.1      ..With means for actuating brake element
- 188/72.4      ...By fluid pressure piston
- 188/72.5      ....Piston for each of plural elements
  
- 2 188/72.8      (2 OR, 0 XR)
  - Class 188 : BRAKES
  - 188/67      ROD
  - 188/71.1      .Axially movable brake element or housing therefor
  - 188/72.1      ..With means for actuating brake element
  - 188/72.7      ...By inclined surface (e.g., wedge, cam or screw)
  - 188/72.8      ....Screw or helical cam
  
- 2 192/104B      (1 OR, 1 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/82R      .Operators
  - 192/103R      ..Speed responsive
  - 192/104R      ...Fixed-speed release
  - 192/104B      ....Transversely engaged-interior
  
- 2 192/107R      (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/107R      .Engaging surfaces
  
- 2 192/3.51      (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/3.51      TRANSMISSION CONTROL AND CLUTCH CONTROL
  
- 2 192/35      (1 OR, 1 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/31      .Automatic
  - 192/32      ..Manual control
  - 192/35      ...Pilot mechanism
  
- 2 192/45      (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/31      .Automatic
  - 192/41R      ..One-way engaging
  - 192/45      ...Ball or roller
  
- 2 192/48.6      (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/48.1      .Plural clutch-assemblage
  - 192/48.3      ..Diverse clutch-assemblages
  - 192/48.5      ...Including one clutch-assemblage having interdigitated clutch-elements
  - 192/48.6      ....And another clutch-assemblage having unirotationally engaging clutch elements
  
- 2 192/70.17      (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R      CLUTCHES
  - 192/66.1      .Axially engaging



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- 192/70.11 ..Interposed, mating clutch-elements
- 192/70.16 ...With torque connection between  
clutch-element and its shaft
- 192/70.17 ....Resilient torque connection (e.g., for  
damping vibration)
  
- 2 192/70.19 (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R CLUTCHES
  - 192/66.1 .Axially engaging
  - 192/70.11 ..Interposed, mating clutch-elements
  - 192/70.16 ...With torque connection between  
clutch-element and its shaft
  - 192/70.19 ....Axially slidable connection
  
- 2 192/70.2 (0 OR, 2 XR)
  - Class 192 : CLUTCHES AND POWER-STOP CONTROL
  - 192/30R CLUTCHES
  - 192/66.1 .Axially engaging
  - 192/70.11 ..Interposed, mating clutch-elements
  - 192/70.16 ...With torque connection between  
clutch-element and its shaft
  - 192/70.19 ....Axially slidable connection
  - 192/70.2 .....Spline connection for multiple  
clutch-elements
  
- 2 280/276 (2 OR, 0 XR)
  - Class 280 : LAND VEHICLES
  - 280/29 WHEELED
  - 280/200 .Occupant propelled type
  - 280/263 ..With steering
  - 280/270 ...One-wheel controlled
  - 280/274 ....Frames and running gear
  - 280/275 .....Yielding
  - 280/276 .....Front forks and heads
  
- 2 280/277 (0 OR, 2 XR)
  - Class 280 : LAND VEHICLES
  - 280/29 WHEELED
  - 280/200 .Occupant propelled type
  - 280/263 ..With steering
  - 280/270 ...One-wheel controlled
  - 280/274 ....Frames and running gear
  - 280/275 .....Yielding
  - 280/276 .....Front forks and heads
  - 280/277 .....Independent wheel mounting
  
- 2 280/93.512 (0 OR, 2 XR)
  - Class 280 : LAND VEHICLES
  - 280/29 WHEELED
  - 280/80.1 .Running gear
  - 280/771 ..Occupant steered
  - 280/93.502 ...Linkage
  - 280/93.512 ....Kingpin, steering knuckle, steering arm, or  
wheel carrier construction
  
- 2 301/108.4 (0 OR, 2 XR)
  - Class 301 : LAND VEHICLES: WHEELS AND AXLES
  - 301/5.1 WHEEL

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- 301/105.1 .Hub
- 301/108.1 ..Hub cap
- 301/108.4 ...Retained by threaded means
- 2 301/110.5 (1 OR, 1 XR)
  - Class 301 : LAND VEHICLES: WHEELS AND AXLES
  - 301/5.1 WHEEL
  - 301/105.1 .Hub
  - 301/110.5 ..For cycle-type vehicle
- 2 301/35.628 (0 OR, 2 XR)
  - Class 301 : LAND VEHICLES: WHEELS AND AXLES
  - 301/5.1 WHEEL
  - 301/9.1 .Detachable wheel section
  - 301/35.628 ..Dual wheel coupling
- 2 301/35.63 (1 OR, 1 XR)
  - Class 301 : LAND VEHICLES: WHEELS AND AXLES
  - 301/5.1 WHEEL
  - 301/9.1 .Detachable wheel section
  - 301/35.621 ..Disc wheel bolted to hub
  - 301/35.63 ...By central nut
- 2 301/36.1 (2 OR, 0 XR)
  - Class 301 : LAND VEHICLES: WHEELS AND AXLES
  - 301/5.1 WHEEL
  - 301/36.1 .Dual wheels
- 2 303/9.63 (1 OR, 1 XR)
  - Class 303 : FLUID-PRESSURE AND ANALOGOUS BRAKE SYSTEMS
  - 303/5 MULTIPLE FLUID-RECEIVING DEVICES
  - 303/6.01 .Multiple motors
  - 303/9.62 ..Apportioning control
  - 303/9.63 ...Failure responsive
- 2 384/448 (1 OR, 1 XR)
  - Class 384 : BEARINGS
  - 384/91 ROTARY BEARING
  - 384/445 .Antifriction bearing
  - 384/448 ..Sensor or inspection features; liquid metal  
or shipping protection features; bearing member integral  
with seal
- 2 384/544 (0 OR, 2 XR)
  - Class 384 : BEARINGS
  - 384/91 ROTARY BEARING
  - 384/445 .Antifriction bearing
  - 384/456 ..Radial bearing
  - 384/490 ...Ball bearing
  - 384/543 ....Fixed shaft and rotating outer member
  - 384/544 .....For hub
- 2 384/589 (0 OR, 2 XR)
  - Class 384 : BEARINGS
  - 384/91 ROTARY BEARING
  - 384/445 .Antifriction bearing
  - 384/456 ..Radial bearing
  - 384/548 ...Roller bearing
  - 384/586 ....Fixed shaft and rotating outer member

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- 384/589 .....For hub
- 2 384/906 (0 OR, 2 XR)  
     Class 384 : BEARINGS  
     384/900 COOLING OR HEATING  
     384/906 .Antirotaion key
- 2 403/359.2 (0 OR, 2 XR)  
     Class 403 : JOINTS AND CONNECTIONS  
     403/345 INTERFITTED MEMBERS  
     403/359.1 .Longitudinally splined or fluted rod  
     403/359.2 ..Splayed or having a cam surface for  
                 anti-backlash
- 2 475/150 (0 OR, 2 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                 COMPONENTS  
     475/149 ELECTRIC OR MAGNETIC DRIVE OR CONTROL  
     475/150 .Differential drive or control
- 2 475/159 (0 OR, 2 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                 COMPONENTS  
     475/159 WITH LUBRICATON
- 2 475/85 (1 OR, 1 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                 COMPONENTS  
     475/31 FLUID DRIVE OR CONTROL OF PLANETARY GEARING  
     475/84 .Control of differential planetary gearing  
     475/85 ..Special fluid
- 2 475/86 (2 OR, 0 XR)  
     Class 475 : PLANETARY GEAR TRANSMISSION SYSTEMS OR  
                 COMPONENTS  
     475/31 FLUID DRIVE OR CONTROL OF PLANETARY GEARING  
     475/84 .Control of differential planetary gearing  
     475/86 ..By fluid operated mechanical clutch

EA ST 8/11/04

L Number	Hits	Search Text	DB	Time stamp
7	35	("2724252"   "2737033"   "2764261"   "3146860"   "3191735"   "3233704"   "3754624"   "3837420"   "3844385"   "3915272"   "4026393"   "4256209"   "4479569"   "4534457"   "4576255"   "4673065"   "4699254"   "4844206"   "4863000"   "4865160"   "5005676"   "5358079"   "5402865"   "5437351"   "5674026"   "6056089"   "6131932"   "6223863"   "6244391"   "6247560"   "6298953"   "6305510"   "6467588"   "6484852"   "6520296"   "2002/0066625").PN.	USPAT	2004/08/11 08:32
8	1072	188/18a,71.5.ccls. or 301/6.8.ccls.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:36
9	169	(188/18a,71.5.ccls. or 301/6.8.ccls.) and hub same axle same brak\$	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:37
10	30	(188/18a,71.5.ccls. or 301/6.8.ccls.) and hub same axle same brak\$ same wheel near4 flange	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:37
12	321	hub same axle same brak\$ and wheel near4 flange same brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:45
11	42	(188/18a,71.5.ccls. or 301/6.8.ccls.) and hub same axle same brak\$ and wheel near4 flange same brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:38
13	15	("2412432"   "4948437"   "5107966"   "5109960"   "5540303"   "5568846"   "5620042"   "5823303"   "5864935"   "6032768"   "6073735"   "6095291"   "6139215"   "6152270"   "6267209").PN.	USPAT	2004/08/11 08:39
14	54	hub same axle same brak\$ and wheel near4 flange same brak\$4	EPO; JPO; DERWENT	2004/08/11 08:40
15	267	hub same axle same brak\$ and wheel near4 flange same brak\$4	USPAT; US-PGPUB	2004/08/11 08:48
16	184	hub same axle same brak\$ and wheel near4 flange same brak\$4 and (188/\$.ccls. or 384/\$.ccls. or 301/\$.ccls.)	USPAT; US-PGPUB	2004/08/11 08:49
18	153	hub same axle same brak\$ and wheel near4 flange same brak\$4 and (188/\$.ccls. or 384/\$.ccls. or 301/\$.ccls.) and (disk or disc or rotor) with brak\$4	USPAT; US-PGPUB	2004/08/11 08:51
-	18	Gripemark.in.	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:17
-	218	(267/165).CCLS.	USPAT; US-PGPUB	2004/08/10 10:49
-	12	267/165.ccls. and 74/\$.ccls.	USPAT; US-PGPUB	2004/08/10 10:56
-	986	267/\$.ccls. and 74/\$.ccls.	USPAT; US-PGPUB	2004/08/10 10:57
-	1	("5205380").PN.	USPAT; US-PGPUB	2004/08/10 11:25
-	2	haldex.asn. and sleeve same hub same (disk or disk) adj brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 12:21
-	89	sleeve same hub same (disk or disk) adj brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 12:28
-	140	wheel near6 flange same hub same (disk or disk) adj brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:30

-	9	wheel near6 flange same hub same (disk or disk) adj brak\$4 and hub near5 sleeve	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 12:29
-	1	("6766885").PN.	USPAT; US-PGPUB	2004/08/10 13:22
-	58	wheel same hub same (disk or disk) adj brak\$4 same spline\$3	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:51
-	1	2003-449928.NRAN.	DERWENT	2004/08/10 13:34
-	0	wo0345712	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:35
-	0	wo03045712	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:35
-	5	((("5540303") or ("5507367") or ("5988324") or ("6145632") or ("5590967"))).PN.	USPAT; US-PGPUB	2004/08/10 13:45
-	3	5540303.URPN.	USPAT	2004/08/10 13:42

-	150	("5390947" "5944147" "6241052" "5651430" "5862890" "5871413" "5975647" "6039156" "6318810" "3799472" "5906253" "6006869" "4790211" "5205380" RE35055 "4598799" "4478316" "5833035" RE37231 "4576256" "6065580" "5219046" "3876043" "4276964" "4466503" "5357846" "5533599" "5924527" "6152825" "6702397" "5509172" "4491340" "4889519" "4966265" "6260832" "3602339" "4170369" "4280597" "4478317" "4499976" "5193832" "5238259" "5692586" "5699881" "5806794" "5819882" "6253884" "6318525" "4862768" "4440268").pn. ("6230854" "4896712" "5303450" "5449225" "6131642" "4440452" "4616520" "5366300" "5443316" "5476272" "4273460" "4610331" "4761018" "4810039" "4893882" "4953670" "5325945" "6079522" "5855716" "4790413" "5628570" "5791747"	USPAT; US-PGPUB	2004/08/10 13:49
Search History 8/11/04 8:38:47 AM Page 3 C:\APPS\east\workspaces\10750399.wsp				

-	78	("5390947" "5944147" "6241052" "5651430" "5862890" "5871413" "5975647" "6039156" "6318810" "3799472" "5906253" "6006869" "4790211" "5205380" RE35055 "4598799" "4478316" "5833035" RE37231 "4576256" "6065580" "5219046" "3876043" "4276964" "4466503" "5357846" "5533599" "5924527" "6152825" "6702397" "5509172" "4491340" "4889519" "4966265" "6260832" "3602339" "4170369" "4280597" "4478317" "4499976" "5193832" "5238259" "5692586" "5699881" "5806794" "5819882" "6253884" "6318525" "4862768" "4440268").pn. ("6230854" "4896712" "5303450" "5449225" "6131642" "4440452" "4616520" "5366300" "5443316" "5476272" "4273460" "4610331" "4761018" "4810039" "4893882" "4953670" "5325945" "6079522" "5855716" "4790413" "5628570" "5791747"	USPAT; US-PGPUB	2004/08/10 13:50
Search History 8/11/04 8:58:47 AM Page 4 C:\APPS\least\workspaces\10750399.wsp				

-	58	("5390947" "5944147" "6241052" "5651430" "5862890" "5871413" "5975647" "6039156" "6318810" "3799472" "5906253" "6006869" "4790211" "5205380" RE35055 "4598799" "4478316" "5833035" RE37231 "4576256" "6065580" "5219046" "3876043" "4276964" "4466503" "5357846" "5533599" "5924527" "6152825" "6702397" "5509172" "4491340" "4889519" "4966265" "6260832" "3602339" "4170369" "4280597" "4478317" "4499976" "5193832" "5238259" "5692586" "5699881" "5806794" "5819882" "6253884" "6318525" "4862768" "4440268").pn. ("6230854" "4896712" "5303450" "5449225" "6131642" "4440452" "4616520" "5366300" "5443316" "5476272" "4273460" "4610331" "4761018" "4810039" "4893882" "4953670" "5325945" "6079522" "5855416" "4790413" "5628570" "5791747"	USPAT; US-PGPUB	2004/08/10 13:50
Search History 8/11/04 8:58:47 AM Page 5 C:\APPS\east\workspaces\10750399.wsp				

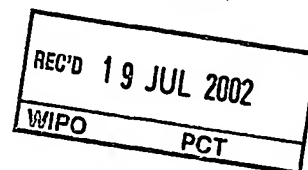


-	513	hub same (disk or disk) adj brak\$4 same axle	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:52
-	44	hub same (disk or disk) adj brak\$4 same axle same wheel near5 rim	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/10 13:52
-	9	Gripemark.in. and hub	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:18
-	0	Gripemark.in. and hub same sleeve	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:18
-	0	Gripemark.in. and hub and sleeve	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:25
-	629	188/18a,71.5,218xl.ccls. and hub same brak\$4	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:26
-	99	188/18a,71.5,218xl.ccls. and hub same brak\$4 same groove	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:26
-	44	188/18a,71.5,218xl.ccls. and hub same brak\$4 and (fixed or stationary) adj2 caliper	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:34
-	424	188/18a,71.5,218xl.ccls. and hub same brak\$4 same wheel	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:34
-	193	188/18a,71.5,218xl.ccls. and hub same brak\$4 same wheel same axle	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:35
-	36	301/\$.ccls. and hub same brak\$4 same wheel same axle same (key or keyed or spline or splined)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 08:34
-	37	188/18a,71.5,218xl.ccls. and hub same brak\$4 same wheel same axle same (key or keyed or spline or splined)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:38
-	216	hub same brak\$4 same wheel same axle same (key or keyed or spline or splined)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:39
-	106	hub same brak\$4 same wheel same axle same (key or keyed or spline or splined) same brak\$4 near3 (rotor or disk or disc)	USPAT; US-PGPUB; EPO; JPO; DERWENT	2004/08/11 07:39
-	0	6330937.URPN.	USPAT	2004/08/11 07:47
-	5	("3860095"   "4186824"   "5507367"   "5540303"   "5568846").PN.	USPAT	2004/08/11 07:47

# PRV

PATENT- OCH REGISTRERINGSVERKET  
Patentavdelningen

PCT/ SE 02/ C1294



## Intyg Certificate



*Härmed intygas att bifogade kopior överensstämmer med de handlingar som ursprungligen ingivits till Patent- och registreringsverket i nedannämnda ansökan.*

*This is to certify that the annexed is a true copy of the documents as originally filed with the Patent- and Registration Office in connection with the following patent application.*

(71) Sökande                      Haldex Brake Products AB, Landskrona SE  
Applicant (s)

(21) Patentansökningsnummer    0102350-6  
Patent application number

(86) Ingivningsdatum                      2001-07-02  
Date of filing

Stockholm, 2002-07-09

För Patent- och registreringsverket  
For the Patent- and Registration Office

Lina Oljeqvist

Avgift  
Fee

**PRIORITY  
DOCUMENT**  
SUBMITTED OR TRANSMITTED IN  
COMPLIANCE WITH RULE 17.1(a) OR (b)

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APPLICANT: HALDEX BRAKE PRODUCTS AB  
TITLE: SLEEVE FOR A DISC BRAKE

5

#### Technical Field

The present invention concerns a sleeve for use at a disc brake. The invention is developed for use with brakes for trucks, lorries, busses, trailers or the like, but a person skilled in the art realises that it may be used for any kind of vehicle.

#### Prior Art

The present invention is intended for use with disc brakes having a fixed caliper. In disc brakes having a fixed caliper one or more brake discs are normally arranged rotatably fixed but axially slideable in relation to the wheel axle. The brake disc is connected to the wheel axle by means of intermediary parts. The intermediary parts are also connected to the wheel flange. In the prior art the number of intermediary parts is often rather high. In view of reducing the complexity and the size of the brake there is a need for a reduced number of intermediary parts. The present invention is directed to said intermediary parts between the brake disc and the wheel axle.

Regarding maintenance one object is that it should be as few steps as possible to replace a brake disc. In the prior art the intermediary parts often comprise a flange disc or a part partly formed as a disc to be attached to the actual wheel flange. If the brake disc is to be replaced the flange disc or the part formed as a disc has to be removed before the disc could be replaced. Thus, one has to go through several steps when replacing a disc brake according to the prior art.

A further problem is that the heat produced during breaking may be quite substantial. Thus, there is a need

for means at the intermediary parts, to protect different parts of the brake and axle against overheating.

#### The Invention

5 One object of the present invention is to arrange the intermediary parts in such a way that a cooling effect is created. The cooling effect is mainly to protect bearing means being part of the intermediary parts. It may also be necessary to protect other parts, such as sensors against  
10 overheating.

The above object is met by a sleeve for a disc brake, which sleeve has means for co-operation with at least one brake disc. The sleeve is to be received on a wheel axle. Furthermore, the sleeve has a groove, the main orientation  
15 of which being parallel with the outer periphery of the sleeve.

A further object of the present invention is to facilitate maintenance of the disc brakes and especially to facilitate replacement of the brake disc.

20 Still a further object of the present invention is to reduce the number of parts used for connecting, directly or indirectly, a brake disc to a wheel axle and wheel flange, respectively.

The integrated sleeve and hub of the present invention reduce the number of intermediary parts between the  
25 wheel axle and the wheel flange from four to two.

Further objects and advantages of the present invention will be obvious for a person skilled in the art when reading the detailed description below of a preferred embodiment.  
30

#### Brief Description of the Drawings

The present invention will be described more closely below with reference to a preferred embodiment, by way of

an example, and with further reference to the enclosed drawings. In the drawings,

Fig. 1 is a perspective view, partly in section of a sleeve according to the present invention fixed to a wheel  
5 flange,

Fig. 2 is a perspective view of the sleeve of Fig. 1, and

Fig. 3 is a perspective view, partly in section, of the sleeve of Figs. 1 and 2 taken from the opposite direc-  
10 tion.

#### Detailed Description of a Preferred Embodiment

The integrated sleeve 2 of the present invention corresponds to a sleeve and hub, normally present at disc  
15 brakes of the prior art.

According to the present invention the integrated sleeve 2 is attached directly to a wheel flange 1. Thus, the wheel flange 1 has to be made strong and stiff enough to carry the sleeve 2 of the disc brake. In the shown embodiment the sleeve 2 is attached to the wheel flange 1 by  
20 means of a number of bolts 3. In the shown embodiment there are twelve bolts 3, but a person skilled in the art realises that the number of bolts may be different in other embodiments. The bolts 3 are received in threaded openings of the sleeve 2. The threaded openings of the sleeve 2 are arranged on the end of the sleeve 2 intended for contact with the wheel flange 1. The threaded openings of the sleeve 2 are adapted to corresponding openings in the wheel flange  
25 1.

30 The integrated sleeve 2 is to be placed on the wheel axle. The inner periphery of the sleeve 2 is received on the wheel axle by way of a bearing means (not shown).

The sleeve 2 is to support one or more brake discs (not shown) by way of means for co-operation with corresponding means of the brake disc(s). In the shown embodi-  
35

ment the means for co-operation with the brake disc(s) is splines. The splines have the form of raised portions 4 and grooves 5 arranged on the outer periphery of the sleeve 2. The actual cross-sectional form of the splines may vary between different embodiments. The splines of the sleeve 2 are to co-operate with corresponding parts of the brake disc(s). The brake disc(s) is received rotatably fixed to the sleeve 2 but moveable in an axial direction.

The outer periphery of the raised portions 4 and grooves 5, forming the splines of the sleeve 2, is straight and parallel with the main extent of the wheel axle. Expressed differently the sleeve 2 has a generally tubular form. The outer form of the sleeve 2 permits a brake disc to be slid off or onto the sleeve 2 in any axial direction.

A groove 6 is arranged in the sleeve 2, which groove is open towards one end of the sleeve 2. The groove 6 is parallel with the outer periphery of the sleeve 2 and is open in the direction away from the wheel flange 1. Thus, the groove 6 does not extend all the way to the end of the sleeve 2 to be attached to the wheel flange 1. By the groove 6 an inner wall 7 is formed at the inner periphery of the sleeve 2. The inner wall 7 has a shorter axial extension directed away from the wheel flange 1 than the outer wall of the sleeve 2.

At the open end of the groove 6, i.e. the end directed away from the wheel flange 1, a number of bridges 8 connect the inner wall 7 to the outer wall of the sleeve 2. The bridges 8 have a stiffening effect. The purpose of the groove 6 is to protect the bearing means placed between the inner wall 7 of the sleeve and the wheel axle against overheating. It is especially the grease of the bearing means that is in the risk of being overheated.

By the form and placement of the integrated sleeve 2 it is fairly simple to replace the brake disc. To replace the brake disc the bolts 3 are first unscrewed and the



## CLAIMS

1. A sleeve (2) for a disc brake, which sleeve (2) has means (4,5) for co-operation with at least one brake disc, and which sleeve (2) is to be placed on a wheel axle, characterized in that the sleeve (2) has a groove (6), the main orientation of said groove (6) being parallel with the outer periphery of the sleeve (2).

2. The sleeve (2) of claim 1, characterized in that the groove (6) is open towards one end of the sleeve (2) and that the groove (6) forms an inner wall (7), which inner wall (7) is parallel with the outer periphery of the sleeve (2).

3. The sleeve (2) of claim 2, characterized in that a number of bridges (8) is arranged between the inner wall (7) and the rest of the sleeve (2), which bridges (8) are arranged in connection with the open end of the groove (6).

4. The sleeve (2) of any of the previous claims, characterized in that bearing means are arranged between the inner wall (7) of the sleeve (2) and the wheel axle

5. The sleeve (2) of claim 4, characterized in that the groove (6) has a cooling effect on the bearing means.

6. The sleeve (2) of any of the previous claims, characterized in that the means for co-operation with the brake disc is splines (4,5).

7. The sleeve (2) of any of the previous claims, characterized in that the sleeve (2) is attached directly to a wheel flange (1).

8. The sleeve (2) of claim 7, characterized in that the groove (6) is open in the direction directed away from the wheel flange (1).

9. The sleeve (2) of claim 7 or 8, characterized in that the sleeve (2) has threaded openings for receiving bolts (3), used to securely screw the sleeve (2) onto the wheel flange (1) and that the wheel flange (1) has openings corresponding to the threaded openings of the sleeve (2).



10. The sleeve (2) of any of the previous claims,  
characterized in that the sleeve (2) has a generally tubu-  
lar form, where the outer periphery of the sleeve (2) is  
generally straight and parallel with the main extent of the  
5 wheel axle, allowing a brake disc to be slid off or slid  
onto the sleeve (2) in any axial direction.

## ABSTRACT

The present invention concerns a sleeve (2) for a disc brake. The sleeve (2) is furnished with splines (4,5) on the outer periphery for co-operation with one or more  
5 brake discs. The sleeve (2) is to be placed on a wheel axle and is attached to a wheel flange 1 by means of a number of bolts 3 received in threaded openings of the sleeve (2). A groove (6) is arranged in the sleeve (2), which groove (6) is parallel with the outer periphery of the sleeve (2) and  
10 is open at one end. The sleeve (2) has a generally straight outer periphery allowing the brake disc(s) to be slid off and slid onto the sleeve (2) in any axial direction.

To be published with Fig. 1

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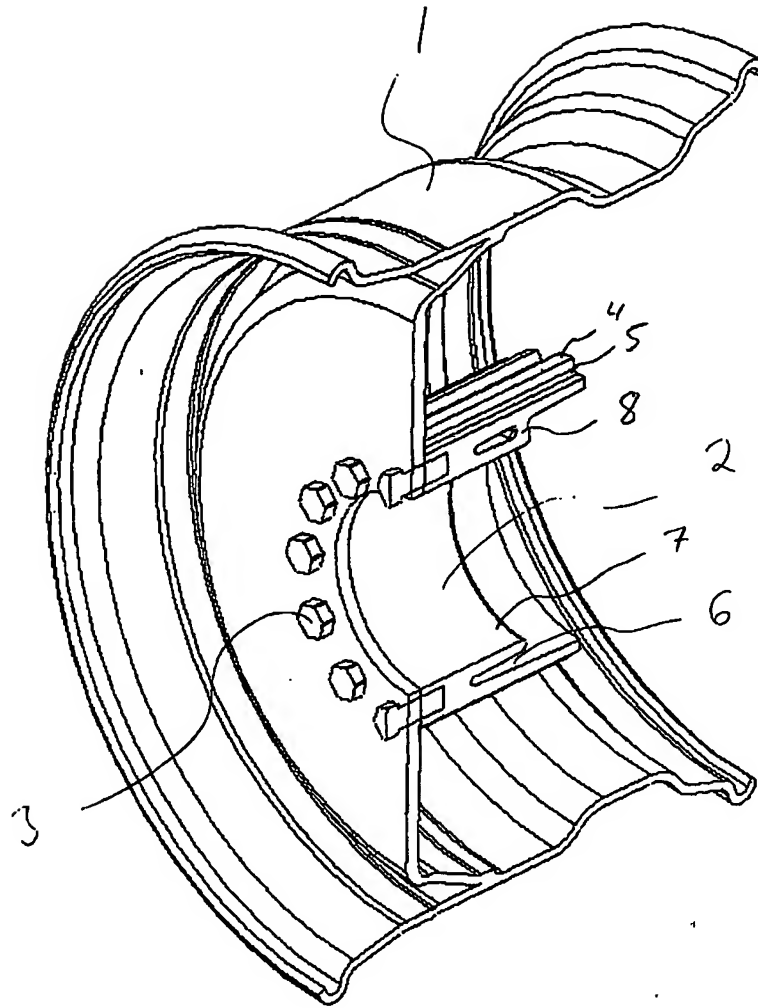


Fig. 1

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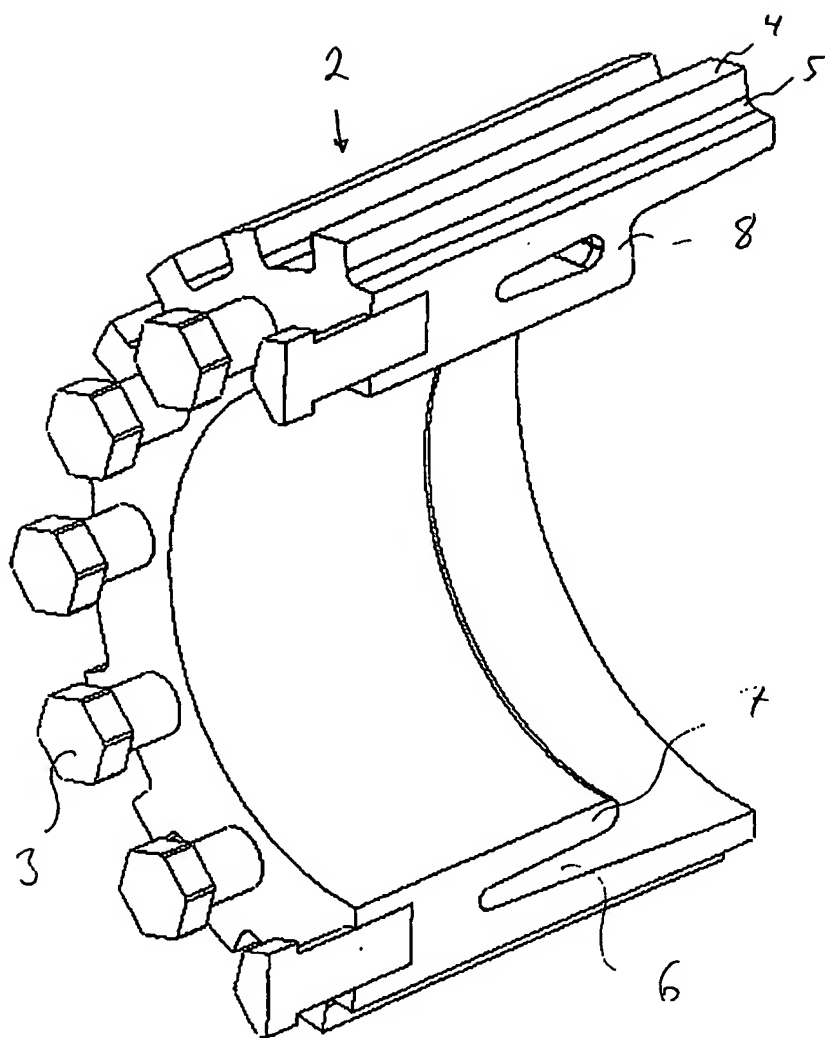
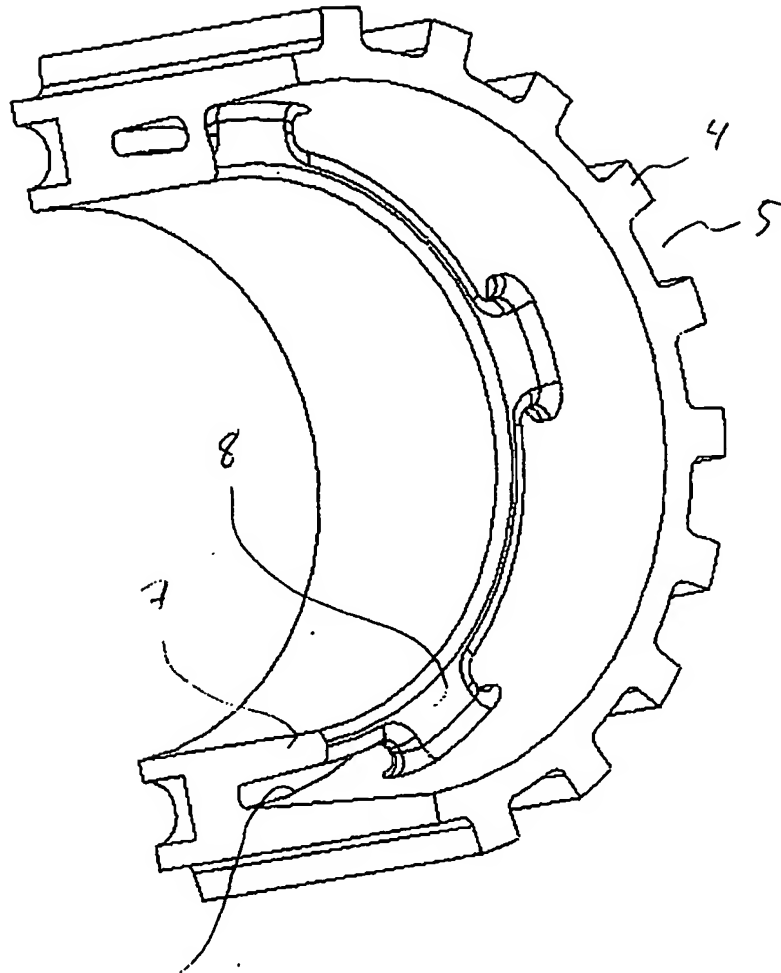


Fig. 2

010702M-01



6 Fig 3

010702M

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Applications viewed: European  
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2004-06-09	■ Priority document (electronically filed)	Search/Exam	12
2004-03-12	■ FFEE/SFEE/DEST/EXAM not paid, TRAN not filed/ADWI	Search/Exam	4
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